

PHYS 211: General Physics Mechanics- General Syllabus

Instructor	Please contact Dr. Costantino for questions djc321@psu.edu
Times	See your course schedule for times & locations
Course Credits	4

Required Text

The text for this course is *Physics for Scientists and Engineers: A Strategic Approach* by Knight, 4th edition. The soft cover custom edition available in the bookstore contains all the chapters required for PHYS 211 and is bundled with the Mastering Physics online homework system described below.

In addition you are also required to have an i>clicker. These are available from the bookstore and elsewhere. You can find out about obtaining and registering i>clickers on the [ITS Clicker website](#). Although there are no assigned points associated with use of the clickers, they are very useful in gauging your understanding of the material and will be used extensively in class.

Finally, we highly recommend that you have a bound notebook in which you will solve all of your online homework problems. Good problem solving practice dictates writing out full solutions (with pictures and words explaining what you are doing) to every homework problem you do. Students often neglect to do this when homework is online; having a notebook specifically for this will encourage you to develop this important habit.

Course Description & Course Objectives

Course Description

Calculus-based study of the basic concepts of mechanics: motion, force, Newton's laws, energy, collisions, and rotation.

For a detailed listing of lecture topics and a schedule of major course events, look in Modules in Canvas.

Course Objectives

Upon completion of PHYS 211, students should be able to demonstrate a mastery of:

0. Using basic math and analytic skills, specifically

- creating and critiquing proposed analyses of physical situations

- using proportional reasoning to analyze relationships
- working with and converting units
- creating and interpreting graphs and data tables
- solving simultaneous linear equations
- differentiating and integrating polynomial functions

- Relating position, velocity, acceleration and time using kinematics relationships
 - in one-dimension
 - in multiple dimensions (e.g., projectile motion)
 - for circular motion

2. Using vectors, specifically
 - a. doing vector arithmetic (addition and subtraction)
 - b. relating vector component and magnitude/direction representations
 - c. multiplying vectors with the scalar "dot" product
 - d. multiplying vectors with the vector "cross" product

3. Forces and Newton's Laws of Motion by
 - a. drawing free-body diagrams to describe forces acting on a system
 - b. applying Newton's Second Law of Motion to a system
 - c. applying Newton's Third Law of Motion to a system
 - d. using gravitational forces (both "mg" and Newton's Law of Gravity)
 - e. using normal force, tension and other elastic forces (Hooke's Law)
 - f. using and distinguishing static and kinetic friction

4. Rotational Motion, such as
 - a. describing rotational motion in terms of angular kinematics variables (and relating them to the linear quantities)
 - b. calculating the rotational inertial (moment of inertia) of a system around a given axis
 - c. determining the torque exerted by a force around a given axis
 - d. relating the net torque on a system to its angular acceleration (rotational version of Newton's Second Law)
 - e. calculating the rotational kinetic energy of a system
 - f. determining the conditions for linear and rotational equilibrium

5. Conservation laws by
 - a. using the impulse-momentum relationship (and understanding its connection to Newton's Second Law) for systems in which momentum is not conserved
 - b. applying conservation of momentum to systems as appropriate
 - c. determining the center of mass of a system
 - d. relating work to force and change in energy
 - e. understanding the nature of potential energy and calculating the (change in) potential energy of a system
 - f. calculating the kinetic energy of an object
 - g. applying conservation of energy to situations as appropriate
 - h. relating power to energy and time and/or force and velocity
 - i. analyzing collisions using conservation of momentum and characterizing them in terms of changes in energy
 - j. calculating the angular momentum of a system around a given axis
 - k. employing conservation of angular momentum as appropriate

6. Oscillations, including
 - a. employing the mathematical description of oscillations (in terms of amplitude, angular frequency and time)
 - b. determining the angular frequency of common oscillatory systems (e.g., mass-spring, pendulum)
 - c. relating angular frequency, frequency and period

Course Requirements

You must be registered for the lecture (211), the laboratory (211L), and the recitation (211R)

Weekly MasteringPhysics problem Sets – There will typically be three My Lab and Mastering Physics (<http://www.pearsonmastering.com>) problem set assignments per week, two "pre-class" assignments (covering the required reading), one before each class, and one "post-class" assignment. The due date and time for each My Lab and Mastering Physics assignment appears on My Lab and Mastering Physics. Access to My Lab and Mastering Physics is provided in the PSU custom book in the bookstore. This system allows you to submit your homework at any time. Your grade on each assignment will be available immediately and, in most cases, you will have multiple tries to arrive at the correct answer. Any work done after the due date will not receive credit and no extensions will be given. Because problem sets are available at least a week before the due date and can be done in advance, **NO excuses are allowed (see**

bottom of page for more info on excuse policy). Students are encouraged to work together and collaborate on problem set assignments. Work submitted for individual assessment must be the work of the individual student. Please refer to the Academic Integrity Policy below.

Course Prerequisites

Co-requisite: MATH 140

Grading Policy

Your grade in the course will be based on your performance in the labs, in recitation, on the pre-lecture & problem set assignments, and on the exams with the following weights:

Problem Sets (Mastering Physics)	Recitation	Laboratories	Midterm 1	Midterm 2	Midterm 3	Final	Concept Pre-Survey	Concept Post- Assessment
pre-lecture 5% post-lecture 8%	10%	10%	15%	15%	15%	20%	1%	1%

Final letter grades for the course will be based on an absolute scale. The final course score will be rounded to the nearest integer (69.49 becomes a 69; 69.5 becomes a 70). No curving of any kind will be employed unless the combined average exam score (computed as the combined average of all midterm and final exams taken to date) is less than 70%. In such cases, the grades on the most recent exam will be adjusted by additively raising the exam scores to allow the combined exam average to meet the target minimum of 70%.

The break points for the various grade levels are:

93% ≤	A	≤ 100%
90% ≤	A-	< 93%
87% ≤	B+	< 90%
83% ≤	B	< 87%
80% ≤	B-	< 83%
77% ≤	C+	< 80%
70% ≤	C	< 77%
60% ≤	D	< 70%
0% ≤	F	< 60%

You are responsible for verifying all of your scores (with the exception of the final exam score) before the final exam for the course.

Attendance Policy

Lecture

You must attend the lecture section for which you are registered.

During "lecture" class sessions you will have the opportunity to ask questions about the reading and will get practice answering conceptual questions (using clickers) and solving problems. Participation during class is not only expected but is also crucial for learning the material.

Laboratories

Laboratory sections meet for about 2 hours once a week in 312 Osmond. Your meeting time is determined by your 211L section number. You must attend the laboratory section in which you are scheduled — no switching is permitted.

The laboratories are designed to provide you with hands-on experience with the material being investigated in class. Laboratory instructors lead the laboratory sessions and act as your guides as you explore the material. You will work collaboratively in three-member lab groups to carry out the experiments. The experiments are in the Laboratories page on Canvas.

During the lab session, your group will prepare a single write-up, addressing specific points of the experiments. This write-up must be submitted by your group before the end of the laboratory session and all group members must be present when the report is submitted in person to the laboratory instructor.

Recitation

Recitation sections meet once a week for 50 minutes. Your meeting time and location is determined by your 211R section number. You must attend the section for which you are registered. No switching is permitted.

In these sections you will work collaboratively in three-member groups to complete problem-solving exercises. These problem solving activities are an invaluable component of learning physics, and will provide you with much more opportunity to explore problem solving techniques than you will have in class.

The recitation activities are available in the Recitations page in Canvas. While only one paper is turned in, every student should bring an individual copy of the pertinent activity to the recitation section to have later for study purposes.

[return to top of page](#)

Exam Policy

There will be three midterm exams and a cumulative final exam (date to be set by the Registrar). Exams will be closed book. Relevant physical constants and formulae will be provided. Calculators, cellular phones, smart phones, any other communication devices, tablet computers, and organizers, and additional paper are not allowed. Room is provided for scratch work in the exam booklet.

The exams will be based on the assigned reading in the textbook, the material covered in lecture, the recitations, the laboratories, and the homework assignments. Please see the Course Content Objectives and the Exams module in Canvas for more information about the content assessed on the exams in this course.

[return to top of page](#)

Academic Integrity

Pretty simple really, don't cheat and don't plagiarize. If you think you are doing something wrong, you probably are. We take academic integrity very seriously. There are many ways to get help in this course and we hope you do contact any member of the instructional team if you feel unsure about the material and worry about your grade. Our goal is for you to learn the material and succeed in the course. Everyone can get an A and we are ready to help any students that struggle.

In exchange for your hard work, participation and academic integrity we promise to create the best learning environments that we can and to help you as much as we can. There will be many opportunities for help and we are fair to all students. Collaborations and discussions among the students are strongly encouraged (they help learning) but we expect your best efforts to individually learn the material and we expect honesty and academic integrity in all aspects of the course.

As described in [The Penn State Principles](#), academic integrity is the basic guiding principle for all academic activity at Penn State University, allowing the pursuit of scholarly activity in an open, honest, and responsible manner. We expect that each student will practice integrity in regard to all academic assignments and will not tolerate or engage in acts of falsification, misrepresentation, or deception. To protect the fundamental ethical principles of the University community and the worth of work completed by others, we will record and report to the office of Judicial Affairs all instances of academic dishonesty.

[return to top of page](#)

Disability Policy

Penn State welcomes students with disabilities into the University's educational programs. Every Penn State campus has an office for students with disabilities. Student Disability Resources (SDR) Web site provides contact information for every Penn State campus: <http://equity.psu.edu/sdr/disability-coordinator>. For further information, please visit Student Disability Resources Web site: <http://equity.psu.edu/sdr>.

In order to receive consideration for reasonable accommodations, you must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: <http://equity.psu.edu/sdr/guidelines>. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with an accommodation letter. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. You must follow this process for every semester that you request accommodations.

[return to top of page](#)

Miscellaneous

Excuse and Makeup policy

Laboratory and Recitation

The laboratory and recitation components of this course are structured around collaborative learning. You must be present in laboratory or recitation to do these assignments. If you are absent from a laboratory or recitation section with a valid excuse, as described under "Valid Excuse Policy", **fill out the Makeup form in Canvas (in the Course Resources Module) within one week of the absence** (right before each exam, you will have less than a week to request a makeup). You will make up the missed activity during the next week there is an exam. Your score for the missed activity will be recorded as a zero until the activity is made up. If you are absent without a valid excuse, a score of zero will be recorded for that assignment. If a

student is more than ten minutes late to a lab or recitation, they cannot receive any credit for that period's so be on time!

Problem Sets (My Lab and MasteringPhysics)

You must complete the Problem sets as scheduled. They are available early so no excuses are accepted. Even technical glitches are not valid excuses.

Examinations

All students should plan to take their exams at the scheduled times. Students can request conflict exams only by filling the conflict exam signup form in the Exams folder by the deadline indicated on the form (a week before the exam). In the case of sudden or unexpected events that will cause them to miss an exam, students are required to notify the course administrator prior to the exam or as soon as is reasonably possible.

Lab/Recitation Makeup Policy

Up to three (3) activities (labs and/or recitations) may be made up for a student throughout the entire course for University-approved reasons. More than three absences from activities at their regular times will interfere excessively with student learning. In extreme circumstances in which a student has four or more absences to be made up, he or she must contact the course administrator directly to discuss the situation as soon as possible. Requests to make up or be excused from a missed evaluative event due to reasons that are based on false claims is cheating and will be treated as described in the Academic Integrity Policy 49-20 <http://science.psu.edu/current-students/Integrity/Policy.html>.

* The student must provide all requested information on the Makeup Form and electronically sign the form. Incorrect or missing information will result in the request for a makeup to be denied.

* Family emergencies include a death in the immediate family, death of a close friend, sudden hospitalization of a close family member, and events of similar gravity.

* To obtain a makeup for university-approved curricular and extra-curricular activities, a student needs to obtain a letter (or a class absence form) from the unit or department sponsoring the activity. The letter must indicate the anticipated absence dates, and it must be emailed to the course administrator (mts56@psu.edu) before the first absence.

* In the case of religious holidays, students should submit the makeup request before the date of the absence.

Since University regulations require course instructors to make conflict exams available to students, missing a laboratory or recitation due to an examination in another course is not considered a valid excuse for absence and thus not a reason for making up an activity in this course. You have one week from the absence to submit a makeup request (less time right before each makeup period); otherwise it may be denied, barring extenuating circumstance (e.g., no access to the Internet due to reason for absence, such as an extended hospitalization).

[return to top of page](#)